23PCA11 — DISCRETE MATHEMATICS

Time : Three hours   Maximum : 75 marks

SECTION A — (10 × 2 = 20 marks)

Answer ALL the questions.

1. Mention the various set operations used in a relation set.

2. What is an inverse function?

3. Construct the truth table for the following:

   (a) $(P \vee Q) \to [(P \vee R) \vee (R \vee Q)]$

   (b) $[(P \vee (Q \to R))] \leftrightarrow [(P \vee \neg R) \to Q]$.

4. What do you mean by valid argument in propositional calculus?

5. Find a recurrence relation and initial conditions for the number an of binary strings of length n that do not have two consecutive 0's. Find the number of such strings of length 7.

6. Find the number of ways of awarding first, second and third prizes to 15 students.
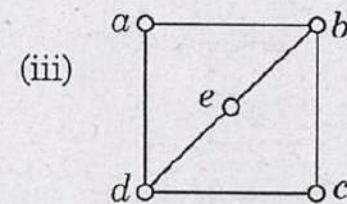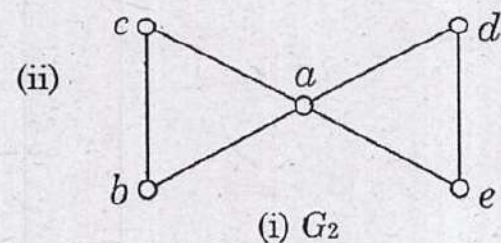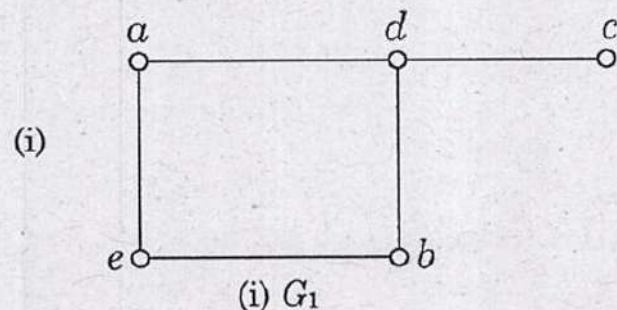
2233

14. (a) Find the inverse of the following matrix

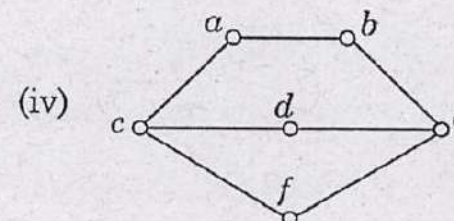$$A = \begin{bmatrix} 3 & 2 \\ 1 & 5 \end{bmatrix}.$$

Or

(b) How will you find the rank of a matrix? Explain with an example.

15. (a) If G is a simple graph with n vertices, $n \geq 3$, and at least $C(n-1,2)+2$ edges show that G has a Hamiltonian circuit.
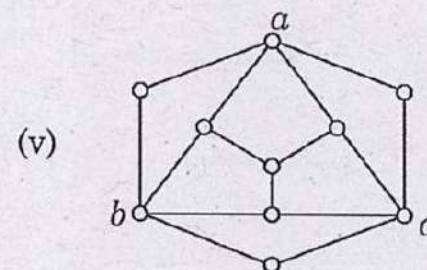
Or

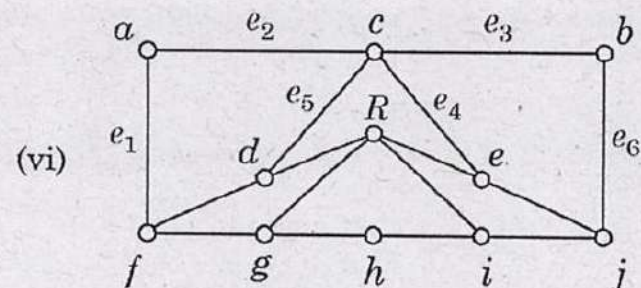(b) Show that the following graphs do not have Hamiltonian circuits. Which of them has a Hamiltonian path?

(i)

(i) G_1

(ii)

(i) G_2

(iii)

(iii) G_3

(iv)

(iv) G_4

(v)

(v) G_5

(vi)

(vi) G_6

4   2233

5   2233